

Teaching the Process of Science

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Comprehensive Program

2010 Abstract

Partner: Stanford University (California).

The project objective is to develop a set of teaching materials that explicitly convey scientific process and the nature of scientific research. These materials will be made freely available on the Visionlearning Web site, where they can be paired with disciplinary science content or used independently as a Process of Science course curriculum. The ultimate goal of this work is to catalyze a shift in the way undergraduate introductory science courses are taught by exposing a greater number of undergraduate students, both science majors and non-science majors, to scientific process and scientific research.

The materials developed will be used and evaluated at multiple postsecondary institutions, both as supplements within traditional disciplinary courses and in courses focused on scientific process. The modules being developed fall into three key concept areas: 1) the nature of science; 2) the practice of science; and 3) the impact of science.

As of June 2009, the majority of planned project tasks were on schedule. The Project Director and Senior Editor have been actively drafting modules for the project for which members of our expert panel have served as peer reviewers. To date, 13 of 23 planned modules have been completed and launched publicly; two additional modules are complete and being entered into the database; three additional modules have been drafted and are being finalized, and the five remaining modules will be completed in Summer 2009.

Project staff members drafted an assessment instrument and have tested it in a live classroom. There was considerable variability in student responses to this preliminary instrument. As such, a revision of the instrument is underway. The new instrument will be validated this fall, and implemented in a live classroom in Spring 2010.

The project's expert panel met for the third time in January 2009 and approved the public and draft modules and reviewed data from the preliminary instrument, as well as recommended the revision and reimplementation of the instrument. The expert panel also recommended the organizing a follow up meeting in Summer 2009 to discuss Process of Science assessment tools and objectives. The meeting was held in July 2009. The revised instrument was validated at this meeting and will also be validated with students in Fall 2009.

Staff members have worked to redesign infrastructure of the Visionlearning Web site to better accommodate the new modules under development. The revised site is now active and, in Fall 2009, site infrastructure will expand to accommodate online assessment, as recommended by our advisory group. Project dissemination is also underway.

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ONLINE REFERENCES:

President Honors Outstanding Science, Math, Engineering  
Mentors <http://www.whitehouse.gov/the-press-office/2011/01/21/president-honors-outstanding-science-math-engineering-mentors>  
Visionlearning - The science education Internet portal where project materials will be launched <http://www.visionlearning.com>

SUBJECTS:

- ◦ ◦ Chemistry
- ◦ ◦ Environmental Sciences
- ◦ ◦ Natural Sciences
- ◦ ◦ Quantitative Reasoning
- ◦ ◦ Teacher Education
- ◦ ◦ Teaching Effectiveness
- ◦ ◦ Technology/Instructional Technologies
- ◦ Biology
- ◦ STEM

Subject Key:

- ◦ ◦ Highly relevant
- ◦ Relevant
- Slightly relevant

SPECIAL DESIGNATIONS:

Minority Serving Institution